WHAT IS CLAIMED IS:

1. A data coding method comprising:

accepting digital data for coding;

pseudo-chaotically coding the digital data by allocating the digital data to a state sequence assigned according to a chaotic map;

converting the pseudo-chaotically coded data to analog form and modulating the pseudo-chaotically coded data into synchronization frames.

2. The data coding method according to claim 1, wherein said step of pseudo-chaotically coding comprises:

shifting the digital data in a shift register with a most recent bit of information in a given clock cycle of shift register operation being assigned as a least significant bit in the shift register and the oldest bit being discarded.

3. The data coding method according to claim 1, wherein said step of pseudo-chaotically coding comprises assigning a state sequence according to symbolic dynamics defined on the chaotic map, wherein a Markov partition identifies symbolic states and transitions associated to the digital data.

4. The data coding method according to claim 1, wherein said step of modulating comprises assigning a position of a pulse train within a synchronization frame for each transmitted bit(s), the synchronization frame being partitioned, according to symbolic dynamics defined on the chaotic map.

5. The data coding method according to claim 1, further comprising a step of randomizing the digital data prior to said step of pseudo-chaotically coding.

6. The data coding method according to claim 5, wherein said step of randomizing comprises a step of compressing the digital data according to a data compression algorithm.

7. The data coding method according to claim 5, wherein said step of randomizing comprises scrambling the data according to a scrambling algorithm.

8. The data coding method according to claim 1, wherein said step of modulating allows a guard interval between synchronization frames.

9. The data coding method according to claim 1, wherein said step of pseudo-chaotically coding comprises steps of:

shifting the digital data into the shift register, wherein the shift register operation approximates the dynamics of a Bernoulli shift map of the form $X_{K+1}= 2X_K \bmod (1)$, and

converting the shifted digital data according to a conversion of the form $X_{K+1}=1 - 2\ |X_K - 0.5|$.

10. A data coding and decoding method, the method comprising steps of:

accepting digital data for coding;

pseudo-chaotically coding the digital data by applying a chaotic map having N states;

converting the pseudo-chaotically coded data to analog form;

modulating the pseudo-chaotically coded data to produce a modulated signal;

transmitting the modulated signal over a channel;

receiving, at a receiver, a signal from the channel;

decoding the pseudo-chaotically coded data from the signal, the decoding comprising Viterbi detection matched to the chaotic map with N or fewer than N states.

11. The method according to claim 10,

wherein said step of pseudo-chaotically coding comprises assigning a state sequence according to symbolic dynamics defined on the chaotic map,

wherein a Markov partition identifies the symbolic states and the transitions associated to the input bits.

12. A data coding system comprising:

a pseudo-chaotic data encoder for pseudo-chaotically encoding digital data, the pseudo-chaotic data encoder comprising a shift register for shifting the digital data and a digital signal processor for translating shifted digital data according to a selected chaotic map;

a digital to analog converter for converting the pseudo-chaotically shifted and translated digital data;

a modulator for modulating output of the digital to analog converter for transmission on a communication channel; and

a receiver for demodulating and decoding the pseudo-chaotically coded data from the signal, the decoding comprising Viterbi detection matched to the chaotic map with N or fewer than N states.

13. The data coding system according to claim 12, further comprising an output mapper that reconstructs the transmitted message given the estimated sequence of states provided by the detector.

14. The data coding method according to claim 12, further comprising a step of randomizing the digital data prior to said step of pseudo-chaotically encoding.

15. The data coding method according to claim 14, wherein said step of randomizing comprises a step of compressing the digital data according to a data compression algorithm.

16. The data coding method according to claim 14, wherein said step of randomizing comprises scrambling the data according to a scrambling algorithm.